Novel system to develop epidemiological cohort data through direct-to-participant digital service

Rikuta Hamaya (1)

1 : Division of Preventive Medicine, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School
2 : Everyone Cohort Inc.

Prospective cohorts are foundational to epidemiology but face critical limitations in the digital era. Prohibitive costs and prolonged, grant-dependent funding cycles restrict their scale, a significant barrier for modern analytics. Specifically, recent machine learning methods for estimating individualized treatment effects were pioneered in fields like digital marketing, which operate on massive datasets. Applying these models to health requires a similar scale (N ~ millions) to achieve reliable performance, a threshold most existing cohorts cannot meet. Furthermore, the rise of a digital ecosystem presents both an opportunity for high-frequency data collection from smartphones and wearables while posing novel health risks, such as those related to social media use. To address these challenges, we have developed "Everyone Cohort," a novel commercial system that redefines the cohort study as a dynamic, participant-centric digital service. Our model is built on the systematic collection of comprehensive, longitudinal questionnaire data covering a wide array of domains, including lifestyle, social environment, and digital behaviors. In exchange, participants receive personalized, evidence-based health feedback with gamified elements to incentivize sustained engagement. This direct-to-participant model ensures long-term operational stability and creates a uniquely sustainable and scalable platform for next-generation epidemiological research. This presentation will delineate the architecture of the Everyone Cohort system. Following its planned launch in September 2025, we will present a detailed analysis of the demographic and baseline health characteristics of the initial participant wave through the end of the year. We will outline the broad research potential of this novel data resource and discuss concrete preliminary findings, including initial cross-sectional analyses exploring the association between digital habits and self-reported mental well-being.

Metabolic Risks of NCDs: Adult Jamdani Weavers in Narayanganj, Bangladesh

Palash Chandra Banik (1)
Tahmina Akhter (2), Halima Akter Sathi (3), Nusrat Jahan Nipa (4), M H Faruquee (5), Mohammad Mizanur Rahman (6)

1 : Associate Professor, Department of Noncommunicable Diseases, Faculty of Public Health, Bangladesh University of Health Sciences (BUHS)

Background : The burden of disease has shifted significantly over the past 30 years, transitioning from communicable to chronic illnesses such as non-communicable diseases (NCDs). Metabolic risk factors for NCDs—including overweight, generalized obesity, central obesity, diabetes mellitus (DM), and hypertension (HTN)—affect all occupational groups and adult populations.

Objective : This study aimed to determine the prevalence of metabolic risk factors for NCDs among adult Jamdani handloom weavers in Narayanganj district, Bangladesh.

Methodology : A cross-sectional study was conducted in 2023 among Jamdani handloom weavers in Narayanganj district. Of the 743 registered workers, 650 met the selection criteria, and 520 agreed to participate. Data on sociodemographic and behavioral factors were collected using a semi-structured questionnaire. Physical parameters such as blood pressure, height, weight, and waist and hip circumference were measured following standard procedures. Ethical approval was obtained from the Ethical Review Committee of Bangladesh University of Health Sciences.

Results : The mean age of the participants was 28.6 ± 10 years; 65.3% were female, and more than half (52.9%) were ≥26 years old. Half of the weavers (50.8%) exhibited at least one metabolic risk factor, including DM (7.1%), HTN (11.7%), overweight (19.6%), generalized obesity (4.6%), and central obesity (39.4%). All metabolic risk factors were significantly associated with age group (*p* = 0.01) and gender (*p* = 0.001). Central obesity and HTN were significantly linked to smokeless tobacco consumption, while overweight and generalized obesity were associated with both smoking and smokeless tobacco use.

Conclusion : Half of the adult Jamdani weavers were at risk of developing NCDs due to metabolic risk factors, underscoring the need for urgent public health interventions.

Key words : Noncommunicable diseases, Risk factor, Metabolic, Jamdani worker, Bangladesh

Comparing Psychosocial, Financial, and Work Outcomes among Young and Older Cancer Survivors in Japan

Aminu Kende Abubakar (1,2)
Hirokazu Tanaka (1), Takahiro Tabuchi (3), Kota Katanoda (1)

1 : Division of Population Data Science, National Cancer Center Institute for Cancer Control, Tokyo, Japan.
2 : Graduate School of Public Health, St. Luke's International University, Tokyo, Japan.
3 : Division of Epidemiology, School of Public Health, Tohoku University Graduate School of Medicine, Sendai, Japan.

Background : Early-onset cancer is increasing globally and poses unique psychosocial and socioeconomic challenges. These challenges may disproportionately burden younger adults due to career disruption, family demands, and limited financial security. This study compared psychological distress, financial hardship, and work performance between younger and older cancer survivors in Japan.

Methods : We analyzed data from the 2024 Japan COVID-19 and Society Internet Survey (JACSIS). Participants aged ≥25 years with a history of cancer diagnosis were included. Outcomes were serious psychological distress (K6 ≥13), financial hardship (any reported economic difficulty in the past year), and reduced work performance in the past 4 weeks (WHO-HPQ). Participants were categorized as younger (<50 years) or older (≥50 years). Propensity scores were estimated for each outcome using sociodemographic and health-related covariates. Stabilized inverse probability of treatment weighting (IPTW) was applied to balance covariates between age groups, and weighted Poisson regression models estimated prevalence ratios (PRs).

Results : We included 2,579 participants (45.0% women; 32.4% younger survivors). The prevalence of psychological distress, financial hardship, and reduced work performance was 13.5%, 38.5%, and 20.9%, respectively. After IPTW adjustment, younger survivors had significantly higher prevalence of psychological distress (PR = 3.76, 95% CI: 2.56–5.54), financial hardship (PR = 1.45, 95% CI: 1.21–1.75), and reduced work performance (PR = 1.72, 95% CI: 1.29–2.28) compared with older survivors.

Conclusions : Younger cancer survivors in Japan experience greater psychological distress, financial hardship, and poorer work performance than older survivors, highlighting the need for targeted interventions addressing the specific needs of this population.

Predicting School Age Mental Status Using Toddler Characteristics and Problematic Behaviors

Geng Chen (1)
Mami Ishikuro (1,2), Hisashi Ohseto (3), Aoi Noda (1,2,4), Genki Shinoda (2), Keiko Murakami (2,5), Masatsugu Orui (1,2,3) Taku Obara (1,2,4), Shinichi Kuriyama (1,2,3)

1 : Graduate School of Medicine, Tohoku University, Sendai, Japan
2 : Tohoku Medical Megabank Organization, Tohoku University, Sendai, Japan
3 : International Research Institute of Disaster Science, Tohoku University, Sendai, Japan
4 : Tohoku University Hospital, Sendai, Japan
5 : Graduate School of Medicine, the University of Tokyo, Tokyo, Japan

Background : Children with atypical mental health status often manifest during school age, by which time they may have already missed the optimal window for early behavioral interventions. Early prediction of school age mental health outcomes using toddlerhood characteristics could facilitate timely identification and intervention, enabling children to receive appropriate support earlier and increasing their chances of catch-up.

Method : This study included 6508 children from the Tohoku Medical Megabank Project Birth and Three-Generation Cohort Study. School age mental status was measured by the Strength and Difficulties Questionnaires at 7 years of age. After splitting the train and test sets into 7:3 proportions, we trained extreme gradient boosting (XGBoost) models to classify the binary outcome using grid search for hyperparameter optimization with five-fold cross-validation. Model performance was evaluated using area under the receiver operating characteristic curve (AUC) in the test set. 13 toddler characteristics, capturing socioeconomic, demographic, perinatal, behavioral and environmental dimensions by 2 years of age, were included as variables. We further included children's specific problematic behaviors at 2 years of age into the model, measured by the Child Behavior Checklist.(13 variables)

Result : XGBoost demonstrated moderate performance in predicting school age mental status using only characteristics by 2 years of age (AUCs: overall 0.61, prosocial 0.60). The model performances were further improved after including the problematic behaviors at 2 years of age (AUCs: overall 0.71, prosocial 0.66).

Conclusion : School age mental health status can be effectively predicted by information available by age 2, especially when incorporating specific problematic behaviors. These findings highlight the potential of early screening to facilitate timely intervention and support for at-risk children.

Current Status of Fatty Liver Disease in School-Aged Children

Masaya Koshizaka (1)
Midori Yamamoto (1), Yu Hirata (1), Kenichi Sakurai (1)
1 : Chiba University / Center for Preventive Medical Sciences

Background : In recent years, metabolic dysfunction-associated fatty liver disease (MASLD), commonly known as fatty liver disease, has increased. MASLD increases the risk of cirrhosis and liver cancer, type 2 diabetes, and cardiovascular disease. With the increase in children with obesity, MASLD is a growing concern not only in adults.

Methods : We conducted physical measurements, body fat measurements, activity level surveys, questionnaires, and blood examinations on 358 children (grades 1-6) who provided informed consent. We estimated the prevalence of MASLD over time from 2020 to 2022 using the ALT/AST ratio and the hepatic steatosis index (HSI), calculated from blood examination results, as indicators of hepatic steatosis. The questionnaire survey included children's sleep, physical activity, electronic device use, mood, stress, depression, QOL, and health status, and examined their association with MASLD.

Results : Children with a potential MASLD based on an ALT/AST ratio >1 increased over time: 2.4%, 5.0%, and 14.0%. Those based on an HSI ≥36 also increased over time: 13.5%, 16.6%, and 36.1%. Those based on an ALT/AST ratio >1 had a significantly larger abdominal circumference (74.2 ± 9.3 cm vs. 62.5 ± 6.9 cm) and a significantly higher body fat percentage (27.6 ± 9.7% vs. 18.3 ± 7.2%). They tended to have higher triglyceride levels. The questionnaire survey revealed that factors such as prolonged electronic device use, reduced outdoor playtime, eating alone, insufficient chewing, and weight gain during the COVID-19 pandemic were also associated.

Conclusion : While 26% of adults in Japan are estimated to have MASLD, school-aged children showed a comparable prevalence percentage. A more detailed understanding of the current situation, including imaging assessments, is needed through larger-scale surveys to identify risk factors, elucidate the underlying mechanisms, and develop preventive measures based on these findings.